

REMARKS

Claims 1-31 are pending in the present application. Claims 1, 21 and 23 are independent claims. Claims 9, 18 and 21 have been amended. Reconsideration of the application, as amended, is respectfully requested.

EXAMINER'S INTERVIEWS

Interviews were conducted with the Examiner regarding objections to the drawings and claim rejections under 35 U.S.C. 112, first and second paragraphs. Applicants prepared a Draft Amendment for review by the Examiner in efforts to secure preliminary agreement on a response that would address the Examiner's concerns. Applicants faxed the Draft Amendment to the Examiner on March 22, 2002 and conducted a follow-up interview with the Examiner on April 3, 2002. The Examiner indicated that proposed drawing changes, along with corresponding amendment to the specification, were acceptable. The Examiner indicated that amendments to the claims, to clarify the relationship between the TFT, source, drain, and storage capacitor, were acceptable. Applicants thank the Examiner for his patience, time, genuine interest and effort expended in resolving the outstanding issues in this application.

ALLOWABLE SUBJECT MATTER

The Applicants appreciate the Examiner's indication that claims 3-6, 11, 12, 14, 15, 19, 10, 25 and 26 contain allowable subject matter.

OBJECTIONS TO DRAWINGS

The drawings stand objected to under 37 CFR 1.83(a) as not showing every feature of the invention specified in the claims.

Claim 9

The Examiner requires that the recited feature of Claim 9, "wherein the drain electrode part has a smaller area than if the drain electrode part was electrically connected to the pixel electrode via a contact hole in the protective layer over the drain electrode" must be shown in the drawing or the feature must canceled from the claim.

The Examiner asserts that the drawings show that the drain electrode part has a greater (rather than smaller) area than if the drain electrode part was electrically connected to the pixel electrode via a contact hole in the protective layer over the drain electrode. Claim 9 has been amended to coincide with the drawing, thus eliminating the need for an amendment to the drawings. Accordingly, Applicants respectfully request withdrawal of the Examiner's objection.

Claim 18

The Examiner objected to the drawings requiring that the recited feature of claim 18, "the pixel electrode overlaps a gate lines less than if the protective layer included a contact hole over a storage electrode part of the metallic pattern" must be shown or canceled from the claim.

Applicants conducted a telephonic interview with the Examiner on March 4, 2002 to discuss the drawings relative to this claimed feature. The Examiner acknowledged that the claimed feature is shown in the drawing, but stated that the feature is not shown with sufficient clarity. Applicants agreed to submit a Drawing Correction Authorization Request (DCAR), proposing changes to the drawings to identify the boundaries of the pixel electrode in a manner such that the extent of overlap/non-overlap of the gate lines is readily apparent. A DCAR is submitted herewith. Applicants have designated the overlapping edge of the pixel electrode as 28A in Figures 2 and 3 and amended to specification accordingly. Withdrawal of the objection is respectfully requested.

Claim 21

The Examiner requires that the recited feature, "a thin film transistor selectively electrically connecting one of the data lines to the pixel electrode" and "storage capacitor having a storage electrode electrically connected to the drain

electrode and the pixel electrode" in claim 21 must be shown or must be canceled from the claim.

Applicants submit that the thin film transistor, identified by reference numeral 30, is shown in the drawing. The TFT consists of source, drain and gate electrodes meeting the requirement for definition as a transistor. For example, figure 2 shows a thin film transistor (TFT) that includes a source electrode (34) protruding from data line (26). The TFT has a gate electrode (32) protruding from gate line (24), and a drain electrode (36A). The drain electrode is part of the same continuous pattern as storage electrode part (36B).

Applicants submit that electrical connectivity does not mean that there is a direct short, for example, a short between source and drain in a manner causing a device not to function. If this were so, the gates in every transistor would establish a short between the source and drain.

In each of the drawings, the drain electrode (part of the TFT) establishes an electrical connection, connecting that portion of the transistor with the pixel electrode. Note that a connection with the pixel electrode can be made via a contact hole at either the storage electrode part or at the drain electrode part of the metallic pattern, because they each form a part of the same continuous pattern.

Similarly, source electrode 34, also part of the TFT, establishes a connection between the TFT and the data line. Source electrode 34, and drain electrode 36A (in FIG. 2) are each connected to gate electrode 32.

Therefore, the TFT does in fact electrically connect the data line to the pixel electrode, and this is clearly shown in the drawing. However, connectivity, in this case, should not be construed as a direct short between the source and drain, causing the device not to function. Current flow in a transistor depends on many factors. Accordingly, reconsideration and withdrawal of the Examiner's objection is respectfully requested.

Likewise, the storage capacitor of claim 21 is also shown in the drawing, and is designated by reference numeral 38. Drain electrode pattern 36 (in FIG. 2), is one continuous pattern. Drain electrode part 36A and storage electrode part 36B are also part of the one continuous pattern or layer. Since this one continuous layer 36 includes storage electrode part 36B, and drain electrode part 36A, the drain electrode part 36A is as much a part of capacitor 38 as is the storage electrode part 36B. Thus, it is valid to say that the storage capacitor has a storage electrode and a drain electrode.

In each embodiment, either the storage electrode part or the drain electrode part is connected to the pixel electrode (via a contact hole). Note that a connection at either point is sufficient to connect the capacitor to the pixel electrode because there is continuity between both electrode parts because of the metallic pattern.

Because of the connection at the contact hole, it is also valid to say that the storage capacitor, storage electrode or drain electrode is connected to the pixel electrode.

Applicants submit that the claimed feature, as described above, is shown in the drawings. Nevertheless, claim 21 has been amended to recite a thin film transistor, **interposed between** one of the data lines and the pixel electrode and including a source electrode connected to the one of the data lines, a gate electrode connected to one of the gate lines a drain electrode, and a storage capacitor having a storage electrode and a drain electrode, the storage capacitor being connected to the pixel electrode. Accordingly reconsideration and withdrawal of the objection is respectfully requested.

REJECTIONS UNDER 35 U.S.C. §112

Claim 9

Claim 9 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. This rejection is respectfully traversed.

In rejecting claim 9, the Examiner asserted that the claim language contradicted the specification in reciting "wherein the drain electrode part has a smaller area than if the drain electrode part was electrically connected to the pixel

electrode via a contact hole in the protective layer over the drain electrode.” In response, the Applicants have amended claim 9 to recite the claimed feature consistent with the specification. Reconsideration and withdrawal if the rejection is respectfully requested.

Claim 21

Claim 21 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. This rejection is respectfully traversed.

In rejecting claim 21, the Examiner asserts that the claim language, as recited, describes the source electrode and drain electrode as both being connected to the pixel electrode, and accordingly will be short-circuited. As argued above extensively, with respect to the Examiner’s objection to the drawings, the source and drain electrodes are not both connected directly to the pixel electrode. While the source and drain electrodes are part of the same transistor (TFT 30), only the drain electrode portion is connected directly to the pixel electrode. A transistor connected to two separate points does not create a short-circuit between the points.

Claim 21 recites “a thin film transistor selectively electrically connecting one of the data lines to the pixel electrode.” Read together with the drawings, it is clearly seen that the TFT makes a connection with data line 26 (through source

electrode 24), and also makes a connection with the pixel electrode 28 (via the drain electrode pattern 36 in FIG. 2). Therefore the TFT does in fact selectively electrically connect one of the data lines to the pixel electrode.

Similarly, as argued above with respect to the Examiner's objection to the drawings, the storage capacitor does in fact have both a storage electrode and a drain electrode. This is possible because both the storage electrode and the drain electrode are parts of one continuous metallic pattern. They form the same point. Therefore claim 21 is not indefinite for the reasons asserted by the Examiner.

Nevertheless, claim 21 has been amended to recite a thin film transistor, **interposed between** one of the data lines and the pixel electrode and including a source electrode connected to the one of the data lines, a gate electrode connected to one of the gate lines a drain electrode, and a storage capacitor having a storage electrode and a drain electrode, the storage capacitor being connected to the pixel electrode. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. §112, second paragraph, is respectfully requested.

Claim 28

Claim 28 stands rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a

way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. This rejection is respectfully traversed.

In rejecting claim 28, the Examiner asserts that the claim language, as recited, renders the device as non-functional in that there is no connection between the pixel electrode and the drain electrode. Using Figure 2 as an example, Applicants requests that the Examiner note that the protective layer does not have a contact hole exposing the drain electrode part (36A) of the metallic pattern. This however, does not preclude connection between the pixel electrode and the drain electrode. The reason is that the protective layer forms one continuous layer that also includes the storage electrode part, and the drain electrode part is connected to the pixel electrode at contact hole 40 at the storage electrode part.

Claim 31

Claim 31 stands rejected on similar grounds. With regard to the rejection of claim 31, using FIG. 3 as an example, the storage electrode, while having no contact hole, is nevertheless connected to the pixel electrode. This is because the protective pattern forms one continuous layer that includes the drain electrode part. Therefore the storage electrode part is connected to the pixel electrode because the drain electrode part is connected to the pixel electrode at contact hole

Accordingly, reconsideration and withdrawal of the rejection of claim 28 and claim 31 under 35 U.S.C. §112, first paragraph, are respectfully requested.

REJECTIONS UNDER 35 U.S.C. §102

Claims 1, 2, 7-10, 13, 16-18, 21-23 and 27-31 stand rejected under 35 U.S.C. §102(e) over U.S. Patent No. 5,982,467 to Lee, for the reasons set forth on pages 5-8 of the Office Action. This rejection is respectfully traversed.

The Examiner asserts that Lee (FIG. D) discloses a metallic pattern, having a drain electrode 137 of a thin film transistor, and a storage electrode 119 of a storage capacitor, as set forth in Col. 6, lines 14-15. While the cited reference indicates that a chromium alloy is deposited on the insulating layer, and that it is patterned by using a fourth mask to form source electrodes 127, drain electrodes 137, and storage electrodes 119, these result only after removing the unwanted portions of the deposited alloy (see FIGS. 4D, 4E and 4F). It is clear from these figures, that after patterning, the storage electrodes 119 and drain electrodes 137 do not share a common point (metallic pattern).

Therefore Lee does not disclose a metallic pattern forming a drain electrode of the thin film transistor and a storage electrode of the storage capacitor, as recited in independent claim 1 and similarly stated in independent claims 21 and 23.

Claims 2, 7-10, 13, 16-18, 22 and 27-31 depend from claims 1, 21 and 23, either directly or indirectly, therefore are patentable at least for the reasons stated with respect to independent claims 1, 21 and 23. Reconsideration and withdrawal of this art grounds of rejection are respectfully requested.

REJECTIONS UNDER 35 U.S.C. §103

Claims 2 and 24 stand rejected under 35 U.S.C. §103(a) over Lee as applied to claims 1 and 23 above, and further in view of U.S. Patent No. 6,100,953A to Kim et al. (Kim). This rejection is respectfully traversed.

The Examiner asserts that Kim discloses a metallic pattern having a drain electrode of a thin film transistor and a storage electrode wherein the metallic pattern is spaced a predetermined distance from the data line.

Kim, however, like Lee (argued above with respect to claims 1, 21 and 23), does disclose or suggest a metallic pattern forming a drain electrode of the thin film transistor and a storage electrode of the storage capacitor, as recited in independent claim 1, and similarly stated in independent claims 21 and 23.

Claims 2 and 24 depend on claims 1 and 23, either directly or indirectly. Therefore Lee, in view of Kim, cannot render claims 2 and 24 obvious to one of ordinary skill in the art. Accordingly, reconsideration and withdrawal of this art grounds of rejection are respectfully requested.

CONCLUSION

Applicants point out that all of the Examiner's comments have been addressed and that all of the Examiner's objections and rejections have been overcome, thereby placing all claims pending in the present Application in condition for allowance. Allowance of the claims is respectfully solicited.

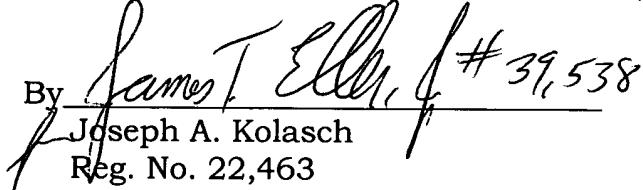
In the event that any outstanding matters remain in this application, Applicant request that the Examiner contact Percy L. Square at (703) 205-8034 to discuss such matters.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

(Rev. 02/06/01)

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

The paragraph on page 8, line 6 and ending on page 9, line 2 has been replaced with the following rewritten paragraph.

--Referring to Fig. 3, there is shown an electrode arrangement of a thin film transistor substrate in a liquid crystal display according to a second embodiment of the present invention. When compared with the thin film transistor shown in Fig. 2, the thin film transistor substrate of Fig. 3 has the same constructional elements except that the drain electrode pattern 42 is electrically connected via a contact hole 44 to the pixel electrode 28 at a drain electrode part 42A. Accordingly, the contact hole for connecting the pixel electrode 28 to storage electrode part 42B is eliminated to reduce an amount of overlap between the storage electrode part 42B and the pixel electrode 28. Note also in Fig. 3 that pixel electrode 28 overlaps gate line 24, the edge of pixel electrode 28 designated by reference 28A, and contrast FIG. 2 in which pixel edge 28A overlaps the gate line more than in Fig. 3. The contact hole for connecting the pixel electrode 28 to storage electrode part 42B is eliminated in Fig. 3. --

IN THE CLAIMS:

The claims have been amended as follows:

9. (Twice Amended) The liquid crystal device of claim 8, wherein the drain electrode part has a [smaller] greater area than [if the] a drain electrode part [was] electrically connected to the pixel electrode via a contact hole in the protective layer over the drain electrode part.

18. (Twice Amended) The liquid crystal device of claim 17, wherein the pixel electrode overlaps a gate line, defining the cell but not connected to the thin film transistor, the overlap of the gate line being less than an overlap in a case wherein [if] the protective layer [included] includes a contact hole over a storage electrode part of the metallic pattern.

21. (Twice Amended) A liquid crystal device having a thin film transistor, comprising:

a plurality of gate lines formed on a substrate;

a plurality of data lines insulated from and intersecting said gate lines, said data lines and intersecting gate lines defining a plurality of cells, at least one cell including,

a pixel electrode,

a thin film transistor [selectively electrically connecting] interposed between one of the data lines [to] and the pixel electrode and including a source electrode connected to the one of the data lines, a gate electrode connected to one of the gate lines, [and] a drain electrode, and

a storage capacitor having a storage electrode and a drain electrode, the storage capacitor being connected to the pixel electrode.